

# California Water Plan Update 2013

## Groundwater Content Enhancement Overview

Plenary Meeting  
October 26, 2011



# Groundwater Content in the Water Plan Updates

- 1998 -
  - Describes overdraft as unsustainable
  - Acknowledges relationships between overdraft rates and surface supply availability
- 2005 - Introduced CM/GWS Resource Management Strategies
- 2009 - expanded content and recommended continued expansion

**What about Update 2013?**

# Water Plan Update 2013

## Groundwater Content Enhancement

### Objective

Expand information about statewide and regional groundwater conditions to better inform groundwater management actions and policies through compilation and summarization of data and analysis.

# Water Plan Update 2013

## Groundwater Content Enhancement

### Premise

- ❑ Existing water laws and regulations are in place
- ❑ Deliverables are based on the best existing and available data, information, and analyses



# Water Plan Update 2013

## Groundwater Content Enhancement

### Work Plan

1. Compile groundwater information
2. Summarize groundwater conditions and management activity
3. Identify data gaps
4. Estimate annual change in groundwater storage
5. Present Case Studies
6. Inventory and describe potential for conjunctive management of groundwater and other supplies
7. Inventory and describe potential for groundwater banking and integrated flood management
8. Develop preliminary sustainability indicators

# Water Plan Update 2013

## Groundwater Content Enhancement

### Schedule

- ☐ Revise Project Charter based on  
Public AC feedback: Spring 2011
- ☐ Form Groundwater Caucus: May 19, 2011
- ☐ Compile and summarize information,  
and identify data gaps: Early 2012
- ☐ Conduct analysis and  
prepare draft document: Spring 2012
- ☐ Refine analysis and document: Spring 2013
- ☐ Finalize analysis and document: Fall 2013

# Water Plan Update 2013

## Groundwater Content Enhancement

### Contact Information

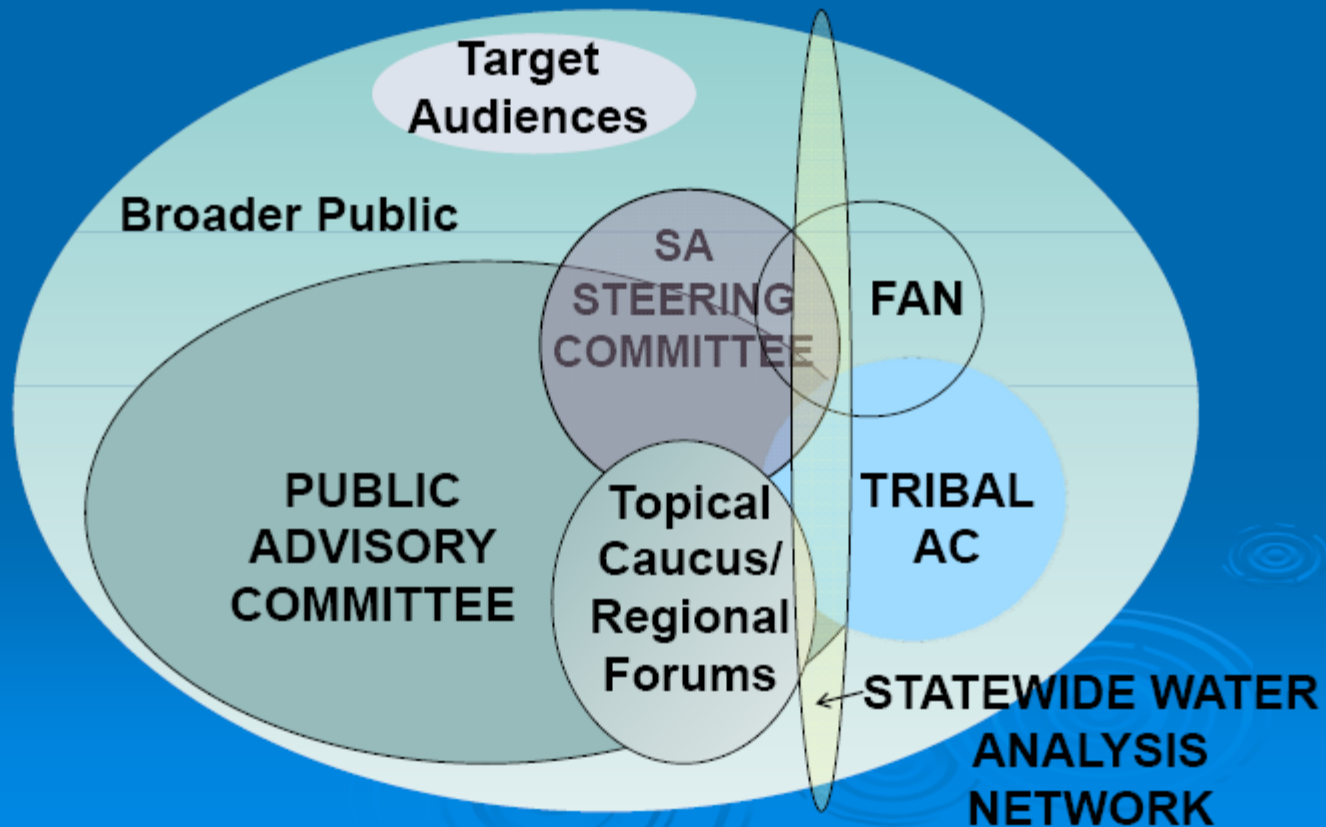
Abdul Khan: [akhan@water.ca.gov](mailto:akhan@water.ca.gov)

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May 19, 2011 Groundwater Caucus Info:  
<http://www.waterplan.water.ca.gov/materials/index.cfm?subject=may1911>

# Ways to Provide Input – Multiple Forums

## Update 2013 Collaboration Venues



# Water Plan Update 2013

## Groundwater Content Enhancement

### Panel Presentation

- ❑ Introduction to Groundwater Caucus
- ❑ Discussion of Deliverables:
  1. Compile groundwater information
  2. Summarize groundwater conditions and management activity
  4. Estimate annual change in groundwater storage
  6. Inventory and describe potential for conjunctive management of groundwater and other supplies





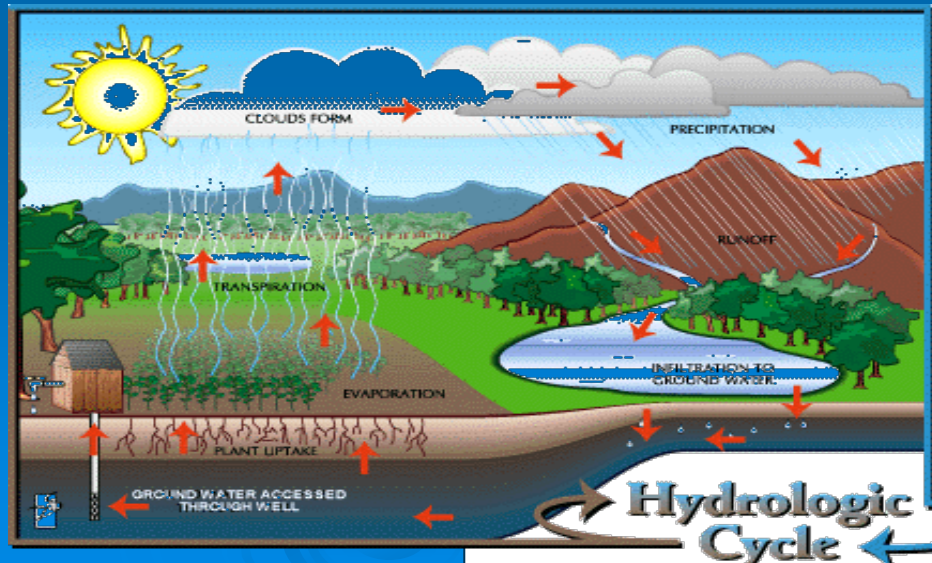
# California Water Plan Update 2013 Plenary Meeting

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## Groundwater Content Enhancement

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### **Deliverable #1:** Compile State, Federal, and Local Planning Activities



# California Water Plan Update 2013 Groundwater Content Enhancement

## Deliverable 1: Compile State, Federal, & Local Planning Activities

- ❑ 1.1 Groundwater Management Plans
- ❑ 1.2 CASGEM Groundwater Monitoring Plans
- ❑ 1.3 Integrated Regional Water Management Plans
- ❑ 1.4 Urban Water Management Plans
- ❑ 1.5 Agriculture Water Management Plans
- ❑ 1.6 Water Transfer Data
- ❑ 1.7 Groundwater Modeling Reports

# California Water Plan Update 2013

## Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

### Task 1.1 Groundwater Management Plans

- ❑ **Purpose:** the planned and coordinated monitoring, operation, and administration of a groundwater basin with the goal of long-term sustainability of the resource.
- ❑ **Status:** 132 Plans
  - ❑ Northern Region 16
  - ❑ North Central Region 35
  - ❑ South Central Region 44
  - ❑ Southern Region 37
  - ❑ *Known of, but haven't found* 13
  - ❑ *Others we're not aware of* ?





# California Water Plan Update 2013 Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

## Task 1.2 California Statewide Groundwater Elevation Monitoring Plans

- ❑ **Purpose:** Statewide groundwater elevation monitoring program to track seasonal and long-term trends in groundwater elevations in CA groundwater basins.
- ❑ **Status: (As of 9/21/11)**
  - ❑ 407 NOTIFICATIONS RECEIVED BY DWR
  - ❑ 31 Designated Basins and Subbasins
  - ❑ 89 Conditionally Designated Basins and Subbasins
  - ❑ 287 Notifications Under Review



# California Water Plan Update 2013

## Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

### Task 1.3 Integrated Regional Water Mgmt Plans

- ❑ **Purpose:** Collaborative effort to manage all aspects of water resources in a region.
- ❑ **Status:** 47 Plans (32 existing, 15 in development)

❑ North Coast	1	❑ Lahontan	3, 2	❑ Sacramento River	5, 3
❑ San Francisco Bay	1	❑ Santa Ana	1	❑ San Joaquin	4, 4
❑ Central Coast	6	❑ Colorado River	1, 2	❑ Tulare-Kern	3, 3
❑ Los Angeles-Ventura	3, 1	❑ San Diego	3	❑ Trans-Colorado-Lahontan	1



# California Water Plan Update 2013

## Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

### Task 1.4 Urban Water Management Plans

- ❑ **Purpose:** Long-term resource planning to ensure adequate water supplies are available to meet existing and future water demands
- ❑ **Status:**
  - ❑ 343 UWMPs were submitted by Aug. 1, 2011, more expected
  - ❑ 38 have been reviewed; 8 have been approved
  - ❑ 70 plans that are in areas seeking IRWM funding, are being reviewed first





# California Water Plan Update 2013

## Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

### Task 1.5 Agricultural Water Management Plans

- ❑ **Purpose:** Advance efficient water management through voluntarily planning, implementing, & evaluating specific irrigation practices.
- ❑ **Status:**
  - ❑ Plans due Dec. 31, 2012; updates due Dec. 31, 2015
  - ❑ Applies to agricultural water suppliers that provide water to > 25,000 acres.
  - ❑ In CA, about 46 entities deliver water to >25,000 acres...which represents more than 80% of agricultural water use.



# California Water Plan Update 2013

## Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ **Task 1.6**
- ❑ Task 1.7

### Task 1.6 Water Transfers

- ❑ **Purpose:** To improve the economic stability and environmental conditions that can deteriorate with water scarcity, by changing the way water is usually distributed.
- ❑ **Status:** Ongoing effort to compile data and reports concerning water transfers.



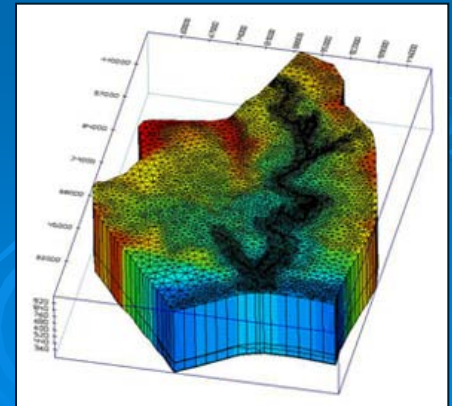
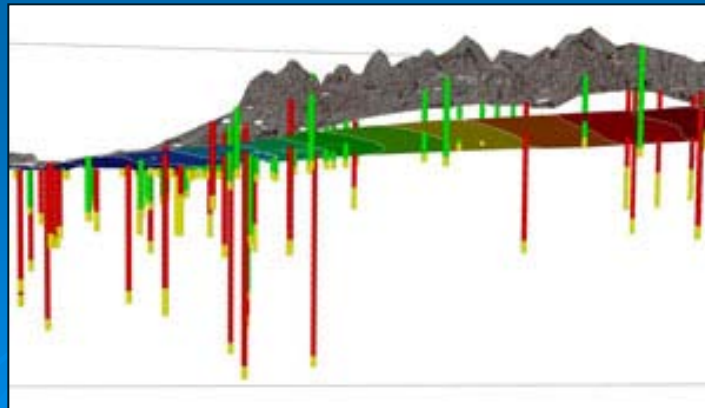
# California Water Plan Update 2013

## Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

### Task 1.7 Groundwater Modeling

- ❑ **Purpose:** Evaluate surface water and groundwater flow interaction, water resources management, and water transfer practices, among others.
- ❑ **Status:** Ongoing effort to compile data and reports concerning groundwater modeling.

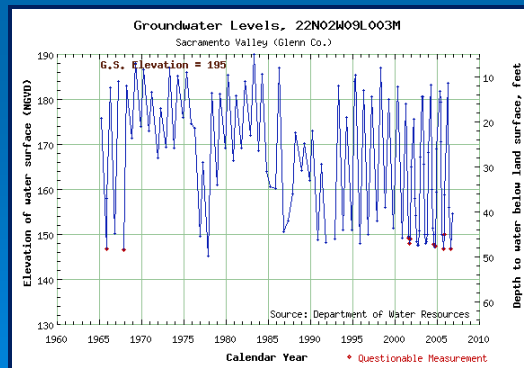




California Water Plan Update 2013  
Plenary Meeting

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**Groundwater Content  
Enhancement**  
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**Deliverable #2:**  
**Summarizing Groundwater Conditions  
and Management Activities**



# Deliverable #2:

## Summarize Groundwater Conditions and Management Activities

### Main Tasks:

- 2.1 Provide brief physical description of the regional aquifer systems
- 2.2 Provide a general overview and status of the regional aquifer conditions
- 2.3 Provide a general overview and status of groundwater management activities.





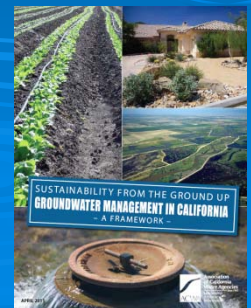
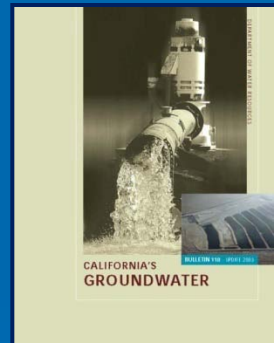
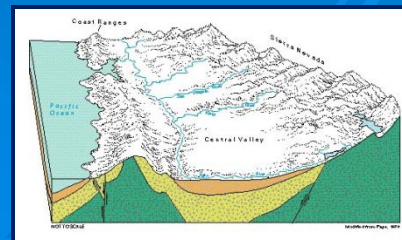
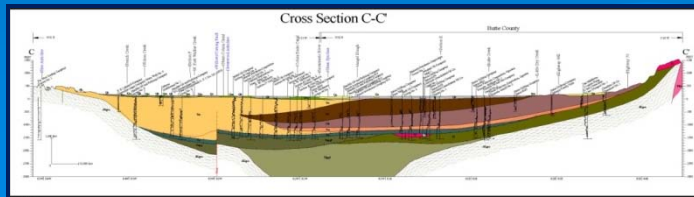
# Deliverable #2:

## Summarize Groundwater Conditions and Management Activities

### 2.1 Provide Brief Physical Description of Aquifer

#### Task Goals:

- Use existing data/information from Bulletin 118, 2003 to provide a brief physical description of the high priority basins and aquifers.
- Pull in additional content and existing information from regional studies, local GWMPs, and IRWM groups.



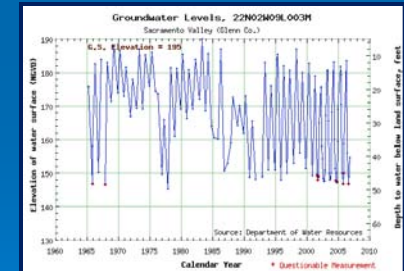
# Deliverable #2:

## Summarize Groundwater Conditions and Management Activities

### 2.2 Provide General Overview and Status of Regional Aquifer Conditions.

#### Task Goals:

- 2.21 Report Existing Regional GW Budget Numbers by County and DAU.
- 2.22 Identify and Report on Key Local GW Hydrographs
- 2.23 Develop Regional Dot Maps for dry vs “normal” WY
- 2.24 Describe Aquifer Response to dry vs normal WY demand
- 2.25 Provide an overview of existing GW problems/issues



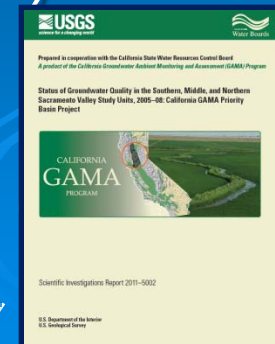
# Deliverable #2:

## Summarize Groundwater Conditions and Management Activities

### 2.3 Provide General Overview and Status of GW Management Activities.

#### Task Goals:

- 2.31 GW Management Plans
- 2.32 GW Ordinances
- 2.33 GW Level Monitoring Programs (CASGEM)
- 2.34 GW Quality Monitoring Programs (GAMA)
- 2.35 Subsidence Monitoring Programs
- 2.36 Managed Recharge Projects
- 2.37 Water Bank and Transfer Activities.



# Deliverable #2:

## Summarize Groundwater Conditions and Management Activities

### Task 2 Status:

#### 2.1 Physical description of the regional aquifers

- First draft will primarily utilize Bulletin 118 description.
- Second draft will include additional information from GWMPs, project studies, and Regional Forum feedback.

#### 2.2 Overview and status of regional aquifer conditions

- Selected key well hydrographs for each hydrologic region.
- Analyzing change in storage by County, DAU, & subbasin.
- Coordinating with ACWA and Regional Forums on potential problem areas (subsidence, quality, quality)
- Developing indicators of groundwater sustainability



## Deliverable #2: Summarize Groundwater Conditions and Management Activities

### Task 2 Status:

#### 2.3 Overview & status of GW management activities

- Developed review template for evaluating status of GWMPs
- Coordinating with ACWA to survey members as to the status of GWMPs and current groundwater management activities.
- Soliciting feedback from Region Forums, IRWM groups, and compiling references on conjunctive use, recharge, and water banking activities.
- Coordinating with CASGEM program reviews to identify monitoring entities and groundwater monitoring plans.
- Coordinating with SBx7-7 program to update status of Urban and Agricultural WMPs

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# Groundwater Content Enhancement

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## **Deliverable #4:**

**Estimating Change in Groundwater  
Storage using Groundwater Level Data**



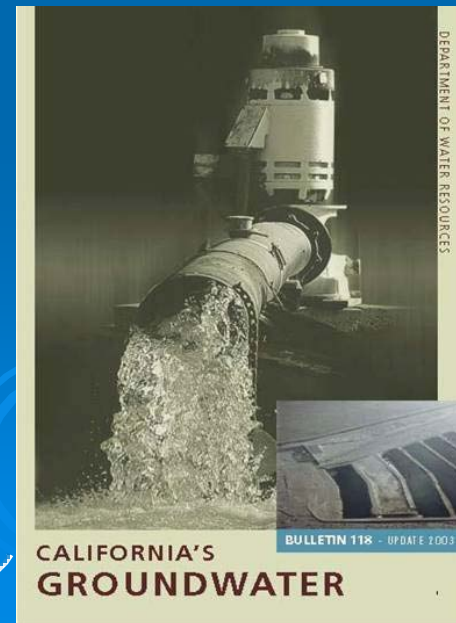
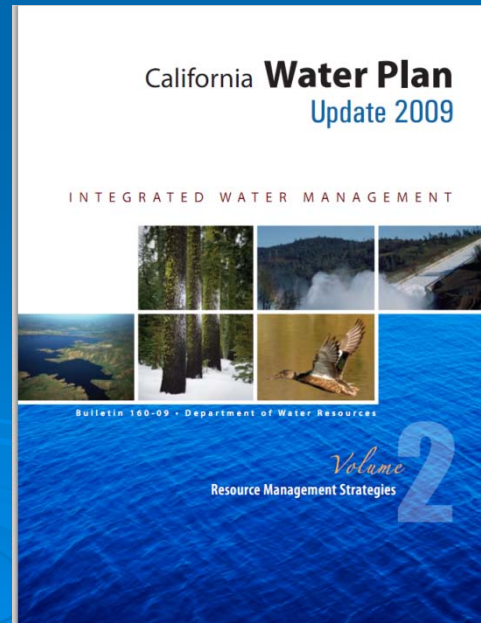
# Overview

- Task 4 delivers estimated **change in groundwater storage** as determined from **groundwater level data**
- A **GIS model** is being developed to complete this task (includes “tools” and “workflows”)
- The Task 4 Deliverable:
  - 4.1 - A technical memorandum describing the GIS model
  - 4.2 - Annual “Spring” GW level data, 2006 - 2010
  - 4.3 - Estimated yearly change in GW storage, 2006 – 2010
  - 4.4 - Report change in GW storage results



# Key Points

- Estimating Change in Groundwater Storage
  - Requirements / Objectives
  - Description of Method
  - Primary Assumptions
  - Reporting Constraints





# Estimating Change in GW Storage

## Method Requirements

- It is required that the method is transparent, repeatable and reliable
  - Steps are broken down into fundamental components and clearly explained
  - Data inputs and outputs are clearly described and widely available
  - Using the same inputs will generate the same outputs every time
  - The results are reasonable and comparable to other methodologies

# Estimating Change in GW Storage

## Method Description

Goal - Report Change in Groundwater Storage

Data - Groundwater Level Data

Tools - GIS Model: Workflow + Geoprocessing Tools



# Estimating Change in GW Storage

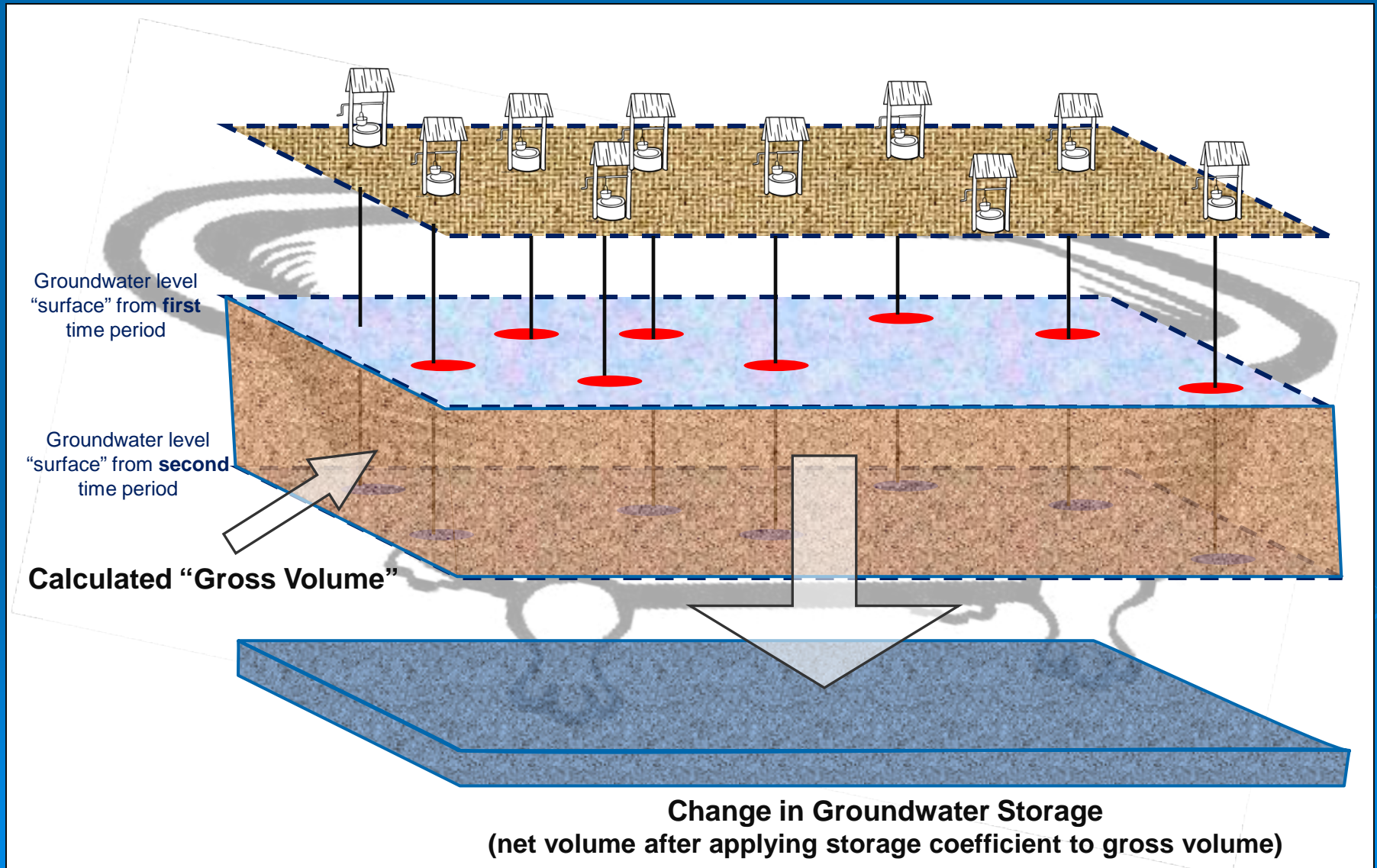
## Method Description (cont.)

### Model Steps -

- 1) Query and filter GW level data
- 2) Generate seasonal GW level datasets (point)
- 3) Create seasonal GW level “surface” (TIN)
- 4) Compare two seasonal GW level surfaces
  - Determines theoretical “gross” volume
- 5) Apply storage coefficient data
  - Determines volumetric change in GW storage
- 6) Report results



# Estimating Change in GW Storage



# Estimating Change in GW Storage

## Primary Assumptions

- Water levels represent unconfined to semi-confined conditions
- All water level data resides in a single database
- All available GW level data are processed and examined
  - Wells are not “pre-selected” (data is filtered and validated)





# Estimating Change in GW Storage

## Primary Assumptions (cont.)

- Uses “Spring” GW level data (data collected during late winter to early spring)
  - Summer and Fall measurements are less consistent
- Basin geometry and boundaries are simplified
  - This is not a 3-dimensional analysis
  - Storage coefficients are considered aquifer constants



# Estimating Change in GW Storage



## Reporting Constraints

- Results are available only where adequate GW level data exists
- Change in GW storage will be reported as a range of values
  - Results are preliminary until reviewed and vetted



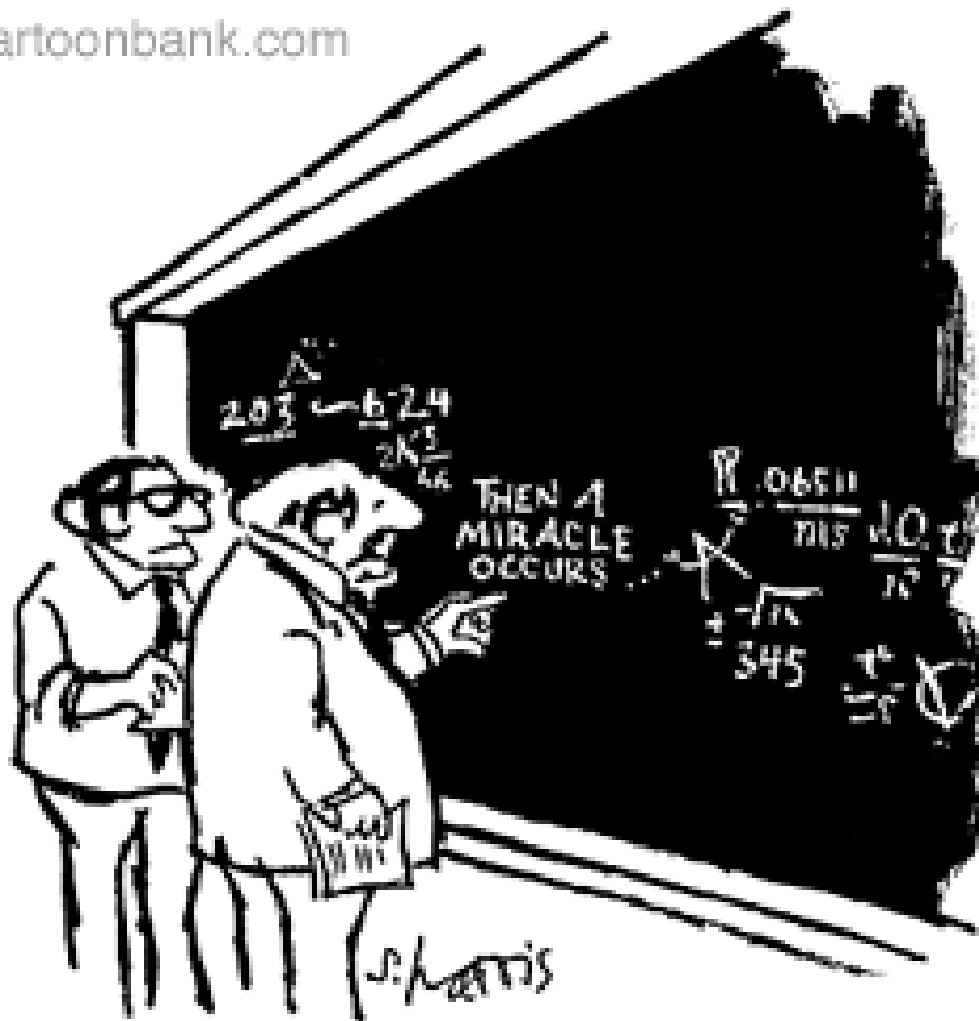
Bulletin 118 Groundwater Basins  
with WDL water level data  
2006 - 2010

Legend

-  Basin with water level data
-  Basin without water level data



© Cartoonbank.com



"I think you should be more explicit here"



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# Groundwater Content Enhancement

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## **Deliverable #6:** **Inventory and Identify Conjunctive Management Potential**



# Deliverable #6:

## Conjunctive Management Potential

### Three Main Goals:

1. Inventory existing conjunctive use, recharge and groundwater banking projects
2. Determine future conjunctive management potential
3. Define constraints

# Deliverable #6:

## Conjunctive Management Potential

### Goal 1: Inventory Existing Recharge, Conjunctive Use and Groundwater Banking Projects

- ❑ Data Gathering – Published Sources
  1. Compile published sources.
  2. Summarize issues, lessons learned, policies, constraints.
  3. Identify data gaps
- ❑ Data Gathering – Past Surveys of Groundwater Banks
  1. Update groundwater banking surveys.
  2. Expand to other types.
- ❑ Public/Private Partnership w/ACWA to update survey information
  1. Data gathering and compiling.



# Deliverable #6:

## Conjunctive Management Potential

### Goal 2: Determine Future CM Potential

- ❑ Identify/map/describe (GIS tool?):
  1. Available aquifer storage space.
  2. Potential recharge areas.
  3. Sources of available water.
  4. Compare with areas of critical need.
- ❑ Groundwater Recharge Potential as a Result of Flooding

# Deliverable #6:

## Conjunctive Management Potential

### Goal 3: Define Constraints

- Limitations on Conjunctive Management
  1. Water quality.
  2. Water rights issues.
  3. Limiting shallow water table.
  4. Land use.
  5. Inconsistent and uncertain regulatory status re: commingling of differing water qualities.
  6. Lack of data and tools.
  7. Storage and conveyance capacity limitations.

# Deliverable #6:

## Conjunctive Management Potential

### Consistency with CWP 2009

- ❑ Increase Groundwater Storage
- ❑ Use Surface Water as an Interrelated Part of Groundwater
  1. Improved local or regional water supply reliability.
  2. Increased flood protection.

# Deliverable #6:

## Conjunctive Management Potential

### Consistency with CWP 2009 Strategic Plan

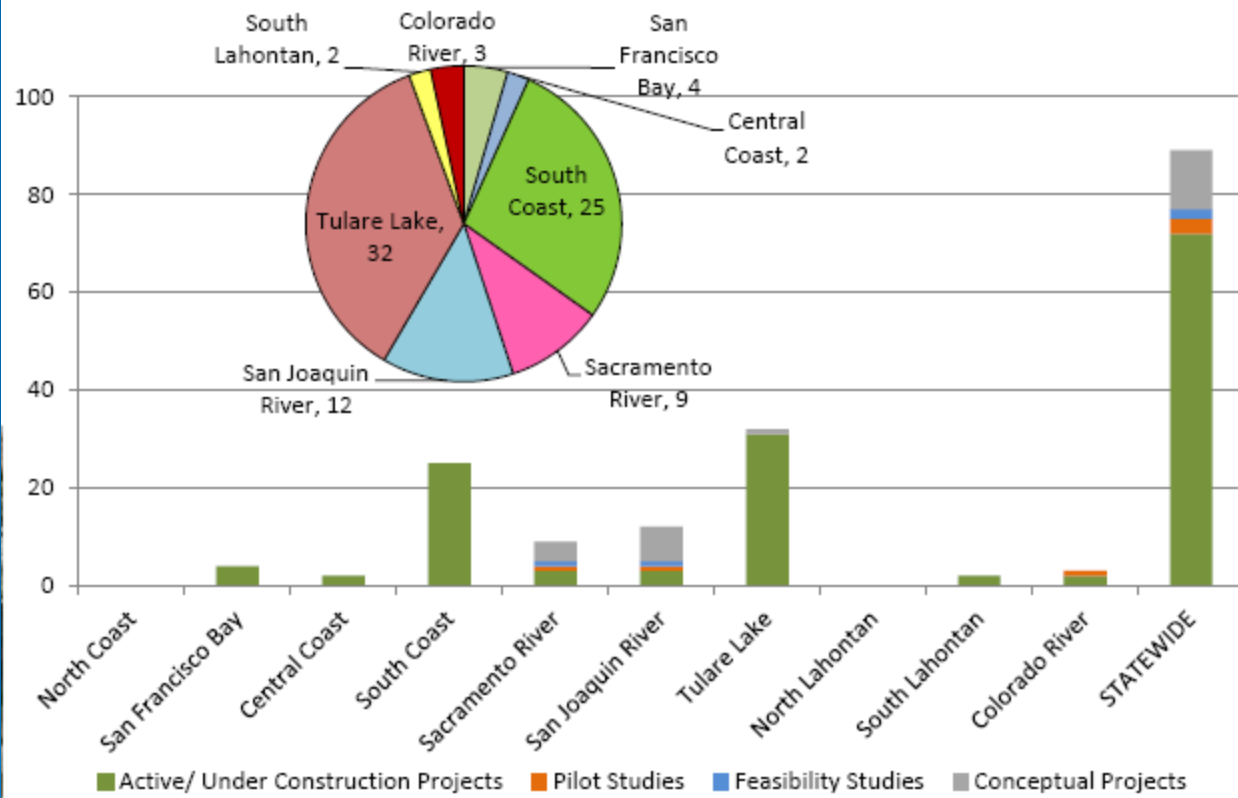
- Objective 2 of the Strategic Plan calls for:
  1. Increase reuse of water.
  2. Improve use of urban runoff .
  3. Increase water supply self-sufficiency.
- Objective 3 of the Strategic Plan calls for:
  1. Use groundwater storage capacity to prepare for: future droughts, floods and climate change.
  2. Improve water management and reoperation of surface storage reservoirs.



# Deliverable #6:

## Conjunctive Management Potential

### Groundwater Banking Conjunctive Use Banking Projects in State of California - Incomplete Preliminary DRAFT



# Ways to Access Water Plan Information

- Visit the *Water Plan Web Portal*  
[www.waterplan.water.ca.gov](http://www.waterplan.water.ca.gov)

**California Water Plan eNews**  
*Wednesday's Update* Oct. 23, 2011

Subscribe Comments/Suggestions Unsubscribe

This weekly electronic newsletter is designed to keep you current on California Water Plan news. We welcome comments, suggestions and any news tips that may be of interest to water planners.

**DWR brochure details development process for Update 2013**  
DWR has published a brochure outlining the ongoing development of *California Water Plan Update 2013* (Update 2013). It includes information detailing new focal areas and changes from the last Water Plan update in 2009. For those wanting to monitor the process of Update 2013, the brochure includes a list of links where the latest information is available.

**Public comment period open for modified agriculture water regulation**  
The California Water Commission has made modifications to a proposed agriculture water measurement regulation and will be accepting public comments on the changes until Thursday, Nov. 3. The modifications were made following an initial round of public comment and input from DWR staff. Instructions on submitting new comments are available online.

**Transportation plan will take California land use goals into consideration**  
The California Department of Transportation will be holding two public workshops to discuss a strategy that would combine California's transportation and land use goals. The *California Interregional Blueprint* is a planning process designed to create more sustainable mobility solutions. The workshops will be held Friday, Nov. 4, in Sacramento, and Tuesday, Nov. 8, in Los Angeles.

**Looking for ways to keep stormwater from going down the drain**  
An article looking at ways to preserve a site's natural ability to retain and use stormwater is in the latest edition of *Western Water*. The publication from the *Water Education Foundation* cites California Water Plan Update 2009 regarding establishment of policies to promote better urban water runoff management. The article also looks at low impact development, which reduces the amount of runoff from a site.

**SGC working on process to set priorities for the next three years**  
Next month's meeting of the Strategic Growth Council (SGC) will include a staff report on the council's *strategic plan*. It is part of the process to establish priorities for the next three years. The meeting will be held Wednesday, Nov. 2, in Sacramento. Details are in the *agenda*. A webcast of the meeting will be available on the *SGC* website.

Click on links below for more information.

Upcoming Meetings Water Plan Website



- Subscribe to *Water Plan eNews*  
a weekly electronic newsletter  
[www.waterplan.water.ca.gov/enews](http://www.waterplan.water.ca.gov/enews)

California Home Governor Home Amber Alert Tuesday, April 27, 2010

Welcome to *California*

**DEPARTMENT OF WATER RESOURCES**  
PLANNING AND LOCAL ASSISTANCE

California Water Plan

Home > Update 2009 - Integrated Water Management  
Update 2005  
Previous Reports  
Brochures & Publications  
Water P.E. Staff where  
Subjects:  
Analytical Tools  
Climate Change  
Management Strategies  
Regional Reports  
Scenarios  
Water Quality  
Partners  
Calendar and Materials  
Steering Committee  
Advisory Committee  
Administrative Center  
Regional Outreach  
SWAR  
Tribal Communication  
Contacts and Comments

**California Water Plan Update 2009**  
Integrated Water Management  
Bulletin 160-09 Department of Water Resources

PHOTOSHOTS (VOLUME 1) (VOLUME 2) (VOLUME 3) (VOLUME 4) (VOLUME 5)

**Release and Contact Information**

	eNews Special Edition 1.1 MB
	Rollout Flier 0.9 MB

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**Secretary's Message**

	The strategies outlined in these pages provide the means to manage resources comprehensively, from snowmelt to estuary, from field to tap, and all of the uses within the watershed. Video of former Director Shue giving his address at the Plenary meeting on
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# California Water Plan Update 2013

## Groundwater Content Enhancement Questions?

